PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference Locata Co.	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International Application No. PCT/AU2003/001246	International Filing Date *(day/month/year)* 19 September 2003	Priority Date *(day/month/year)* 20 September 2002

International Patent Classification (IPC) or national classification and IPC

Int. Cl.[7] H01Q 3/24 H01Q 21/29

Applicant

LOCATA CORPORATION et al

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

   [X] This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 5 sheet(s).

3. This report contains indications relating to the following items:

   - I [X] Basis of the report
   - II [ ] Priority
   - III [ ] Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV [ ] Lack of unity of invention
   - V [X] Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI [ ] Certain documents cited
   - VII [ ] Certain defects in the international application
   - VIII [ ] Certain observations on the international application

Date of submission of the demand	Date of completion of the report
19 April 2004	3 August 2004
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer **SUNIL KAUL** Telephone No. (02) 6283 2182

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/AU2003/001246

Basis of the report

With regard to the elements of the international application:*

☐ the international application as originally filed.

☒ the description, pages **1-15**, as originally filed,
pages , filed with the demand,
pages , received on with the letter of

☒ the claims, pages , as originally filed,
pages , as amended (together with any statement) under Article 19,
pages , filed with the demand,
pages **16-19**, received on **23 July 2004** with the letter of **23 July 2004**

☒ the drawings, pages **2-5**, as originally filed,
pages , filed with the demand,
pages **1**, received on **23 July 2004** with the letter of **23 July 2004**

☐ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages , received on with the letter of

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages

☐ the claims, Nos.

☐ the drawings, sheets/fig.

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/AU2003/001246

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Statement

Novelty (N)	Claims 1-20	YES
	Claims	NO
Inventive step (IS)	Claims 1-20	YES
	Claims	NO
Industrial applicability (IA)	Claims 1-20	YES
	Claims	NO

Citations and explanations (Rule 70.7)

It is apparent that none of the citations in the search report, individually or in combination, disclose the features of the claims 1-20 as indicated above. Furthermore, none of the distinguishing features over prior art would either be obvious to a person skilled in the art or would merely amount to adding common general knowledge. The claims are, therefore, novel and inventive.

What is claimed is:

1. A method for determining accurate range measurements in multipath and poor signal-to-noise ratio environments and subsequently improving location determination at a position receiver incorporating a directionally agile beam antenna, said position receiver configured to receive Time Division Multiple Access (TDMA) positioning signals transmitted by a network of synchronized positioning-unit devices at known locations, the method comprising:

a) calculating the location of said position receiver from said received Time Division Multiple Access (TDMA) positioning signals, and

b) steering said directionally agile beam antenna directional gain pattern exclusively towards the origin of the currently received Time Division Multiple Access (TDMA) positioning signal, said steering responsive to:

i) said calculated location of said position receiver, and

ii) said known locations of said synchronized positioning-unit devices.

2. The method of claim 1, wherein said calculating the location of said position receiver from said received Time Division Multiple Access (TDMA) positioning signals additionally includes a calculation of a network time of said positioning signals transmitted by said positioning-unit devices at known locations, and said steering is additionally responsive to said calculated network time.

3. The method of claim 1, wherein said calculating the location of said position receiver from said received Time Division Multiple Access (TDMA) positioning signals additionally includes the determination of a Time Division Multiple Access (TDMA) sequence of said positioning signals transmitted by said positioning-unit devices at known locations, and said steering is additionally responsive to said determined Time Division Multiple Access (TDMA) sequence.

4. The method of claim 1, wherein said calculating the location of said position receiver from said received Time Division Multiple Access (TDMA) positioning signals additionally includes a calculation of the propagation delay of said positioning signals transmitted by said positioning-unit devices at known locations, and said steering is additionally responsive to said calculated propagation delay.

5. The method of claim 1 wherein said position receiver incorporating a directionally agile beam antenna is further configured with an attitude determination means, said calculating includes an additional step of determining the attitude of said position receiver, and said steering is additionally responsive to said determined attitude.

6. A method for determining accurate range measurements in multipath and poor signal-to-noise ratio environments in a Time Division Multiple Access (TDMA) location network and subsequently improving the location determination at a position receiver, the method comprising:

a) deploying a plurality of synchronized positioning-unit devices at known locations transmitting positioning signals in a Time Division Multiple Access (TDMA) sequence;

b) deploying said position receiver configured with a directionally agile beam antenna;

c) configuring said directionally agile beam antenna to receive said positioning signals from substantially all directions;

d) calculating the location of said position receiver from said received positioning signals;

e) reconfiguring said directionally agile beam antenna to receive said positioning signals from substantially one direction;

f) steering said reconfigured said directionally agile beam antenna directional gain pattern exclusively towards the origin of the currently received positioning signal, said steering responsive to:

i) said calculated location of said position receiver, and

ii) said known locations of said synchronized positioning-unit devices.

7. The method of claim 6, wherein said calculating the location of said position receiver from said received positioning signals additionally includes a calculation of a network time of said positioning signals transmitted by said positioning-unit devices at known locations, and said steering is additionally responsive to said calculated network time.

8. The method of claim 6, wherein said calculating the location of said position receiver from said received positioning signals additionally includes a determination of a Time Division Multiple Access (TDMA) sequence of said positioning signals transmitted by said positioning-unit devices at known locations, and said steering is additionally responsive to said determined Time Division Multiple Access (TDMA) sequence.

9. The method of claim 6, wherein said calculating the location of said position receiver from said received positioning signals additionally includes a calculation of the propagation delay of said positioning signals transmitted by said positioning-unit devices at known locations, and said steering is additionally responsive to said calculated propagation delay.

10. The method of claim 6, wherein said position receiver configured with a directionally agile beam antenna is further configured with an attitude determination means, said calculating includes an additional step of determining the attitude of said position receiver, and said steering is additionally responsive to said determined attitude.

11. A system for determining accurate range measurements in multipath and poor signal-to-noise ratio environments in a Time Division Multiple Access (TDMA) location network, the system comprising:

a) a plurality of synchronized positioning-unit devices at known locations transmitting positioning signals in a Time Division Multiple Access (TDMA) sequence;

b) a position receiver configured with a directionally agile beam antenna;

c) means configured to calculate the location of said position receiver from said transmitted positioning signals;

d) means configured to steer said directionally agile beam antenna directional gain pattern exclusively towards the origin of the currently received positioning signal, said steering responsive to:

i) said calculated location of said position receiver, and

ii) said known locations of said synchronized positioning-unit devices.

12. The system of claim 11, wherein said means configured to calculate the location of said position receiver additionally includes a means configured to calculate a network time of said positioning signals transmitted by said positioning-unit devices at known locations, and said steering means is additionally responsive to said calculated network time.

13. The system of claim 11, wherein said means configured to calculate the location of said position receiver additionally includes a means configured to determine a Time Division Multiple Access (TDMA) sequence of said positioning signals transmitted by said positioning-unit devices at known locations, and said steering means is additionally responsive to said determined Time Division Multiple Access (TDMA) sequence.

14. The system of claim 11, wherein said means configured to calculate the location of said position receiver additionally includes a means configured to calculate the propagation delay of said positioning signals transmitted by said positioning-unit devices at known locations, and said steering means is additionally responsive to said calculated propagation delay.

15. The system of claim 11, wherein said position receiver configured with a directionally agile beam antenna is further configured with an attitude determination means, said means configured to calculate the location of said position receiver includes an additional means configured to determine the attitude of said position receiver, and said steering means is additionally responsive to said determined attitude.

16. A system for determining accurate range measurements in multipath and poor signal-to-noise ratio environments in a Time Division Multiple Access (TDMA) location network, the system comprising:

a) a plurality of synchronized positioning-unit devices at known locations transmitting positioning signals in a Time Division Multiple Access (TDMA) sequence;

b) a position receiver configured with a directionally agile beam antenna;

c) means configured to adjust said directionally agile beam antenna to receive said transmitted positioning signals from substantially all directions;

d) means configured to calculate the location of said position receiver from said transmitted positioning signals;

e) means configured to readjust said directionally agile beam antenna to receive said transmitted positioning signals from substantially one direction;

f) means configured to steer said directionally agile beam antenna directional gain pattern exclusively towards the origin of the currently received positioning signal, said steering responsive to:

i) said calculated location of said position receiver, and

ii) said known locations of said synchronized positioning-unit devices.

17. The system of claim 16, wherein said means configured to calculate the location of said position receiver additionally includes a means configured to calculate a network time of said positioning signals transmitted by said positioning-unit devices at known locations, and said steering means is additionally responsive to said calculated network time.

18. The system of claim 16, wherein said means configured to calculate the location of said position receiver additionally includes a means configured to determine a Time Division Multiple Access (TDMA) sequence of said positioning signals transmitted by said positioning-unit devices at known locations, and said steering means is additionally responsive to said determined Time Division Multiple Access (TDMA) sequence.

19. The system of claim 16, wherein said means configured to calculate the location of said position receiver additionally includes a means configured to calculate the propagation delay of said positioning signals transmitted by said positioning-unit devices at known locations, and said steering means is additionally responsive to said calculated propagation delay.

20. The system of claim 16, wherein said position receiver configured with a directionally agile beam antenna is further configured with an attitude determination means, said means configured to calculate the location of said position receiver includes an additional means configured to determine the attitude of said position receiver, and said steering means is additionally responsive to said determined attitude.

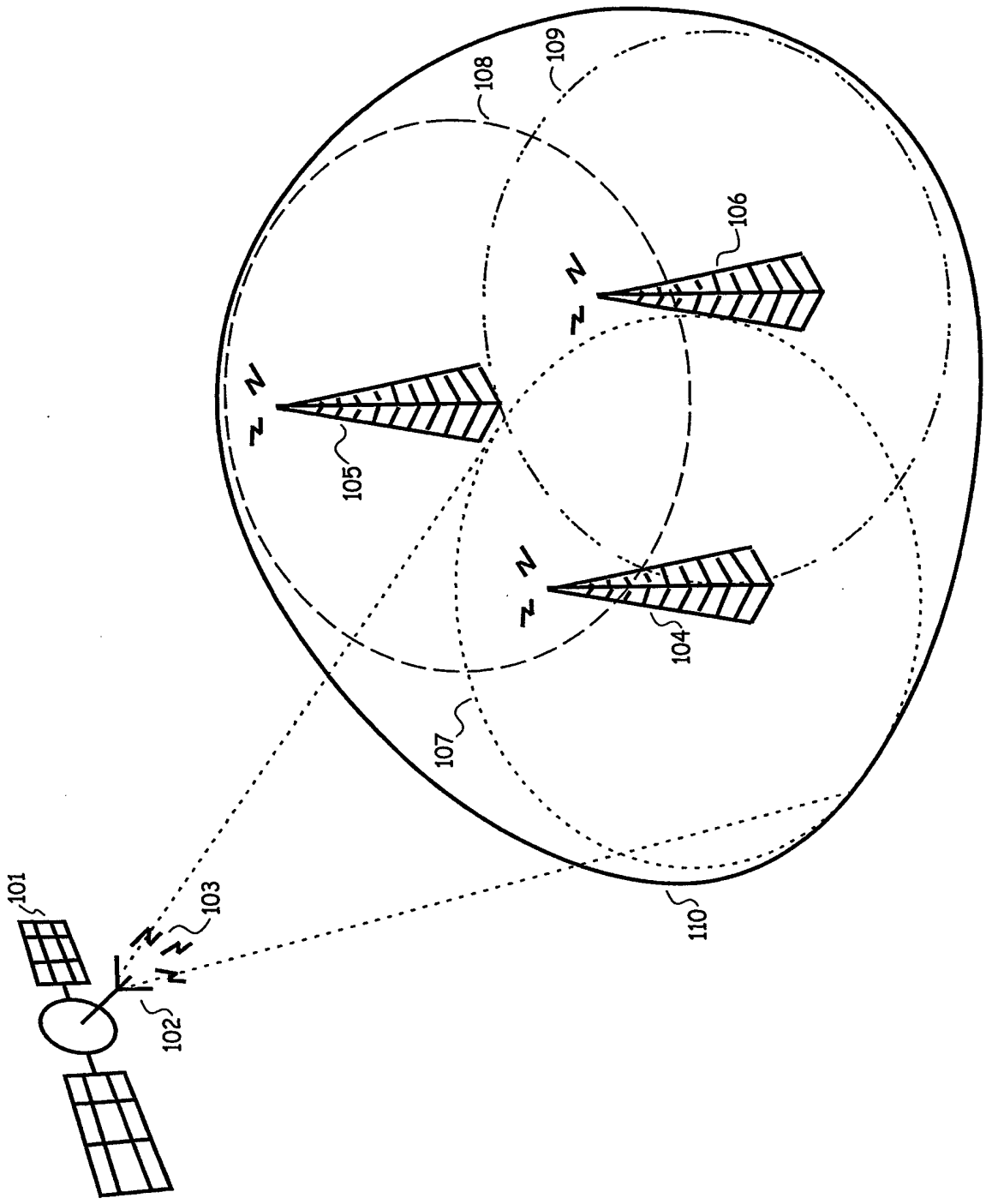

Fig. 1